Capture-Recapture Exam Practice

Q1. Rachel wants to find an estimate for the number of black beetles in a colony. She catches 40 beetles from the colony and marks each one with a dye. She then returns the beetles to the colony. A few days later, Rachel catches another 40 beetles. 16 of these beetles are marked with the dye.
Work out an estimate for the number of beetles in the colony.

Answer:_____

(2 marks)

Q2. Roger is observing a colony of lizards. He captures some of the lizards and tags them before releasing them again.
The next day, he captures a sample of 32 lizards and he counts that 12 of them have been tagged. Roger estimates that there are 272 lizards in the colony. How many lizards did he originally tag?

Answer:_____

(2 marks)

Q3. Tony wants to find an estimate for the number of marbles in a large jar.
He takes out 15 marbles from the jar and puts a sticky label on each one.
Tony then shakes the jar before taking out 15 marbles: he finds that 4 of
them have labels on them.
Work out an estimate for the number of marbles in the jar.

Answer:_____

(2 marks)

Q4. In a store cupboard, there is a large sack containing envelopes. Mary
wants to estimate how many envelopes there are in the sack. She takes a
sample of 68 out and marks the corner of each one using a dot of washable
ink. Mary then returns the envelopes to the sack before shaking it. Next,
she removes a second sample of envelopes and counts that 12 of
have a dot of ink on them.
Given that she estimates that there are 289 envelopes in the sack, work
out how many more envelopes were contained in her first sample than
in the second.

Answer:_____

(2 marks)

Q5. Ray wants to work out an estimate of the number of toads living in a pond. He captures some toads and tags them before returning them to the pond. Next week Ray catches 15 toads, 9 of which are tagged.

a) If Ray estimates that the number of toads in the pond is 135, work out how many toads Ray tagged.

Answer:_____

(3 marks)

b) State any assumptions you have made during your answer to part (a).

Answer:_____

(1 mark)

Q6. In an ant colony, a biologist captures a number of ants, counts them, and tags them all with a harmless white dye. In a few days, she returns and captures a sample of the same size as before. On inspection, she finds that 15 of the ants have white dye on them.
If the first sample was 6% of the entire ant population of the colony, work out an estimate for the total number of ants in the colony.

Answer:_____

(3 marks)

Q7. In a large jar, there are two colours of sweets, red and green. Ed wants to estimate the number of sweets in the jar. He takes a sample of sweets, counts the number of red ones and then replaces them before shaking the jar. Ed then takes another sample of sweets, and counts that there are 30 red ones.
Given that the ratio of red to green sweets in the first sample was $5 : 13$, work out the number of green sweets in the second sample.

Answer:_____

(3 marks)

Q8. An ecologist wants to estimate the number of newts living in a region. One week, he tags some of the newts. The next week he captures 6 fewer newts than he had during the previous week, and he notes that 4 of the newts are tagged. Using this data, the ecologist estimates that there is total number of 70 newts living in the region. How many newts did he tag during the first week?

Answer:_____

(5 marks)